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*Article*

# The Research on Students' Physical Health Integrated with Extracurricular Fitness Running "Lerun" in China College Physical Education Curriculum

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**Abstract: Purpose :** Herein, aimed to explore routines to improve students' physical health. **Methods:** We explored the integration of extracurricular fitness running "Lerun" into college physical education curriculum. Firstly, experimental and the referring groups were selected by experimental method, in which only the experimental group was intervened in combination with extracurricular fitness running "Lerun". After two experiments, the experimental and referring groups were compared in terms of physical fitness (speed, strength, endurance, flexibility, explosive force, etc.), sports skills, body shape, cardiopulmonary function, etc. **Results:** After T-test, significant differences ( $p < 0.05$ ) between these two groups prove that the students' physical health status of experimental group is better than that of the referring group. **Conclusion :** It manifests that integrating extracurricular fitness running "Lerun" into college physical education curriculum is an effective means to improve students' physical health.

**Keywords:** Lerun; college physical education; physical health; extracurricular fitness running

## 1. INTRODUCTION

The students' physical fitness indicators reflected in the National Standards for Students' Physical Fitness and Health (2014 Revision) include physical fitness, body shape, cardiopulmonary function, etc.. The physical health status of college students is not optimistic, how to improve college students' physical health has become crucial to promote the national health strategy and fulfill the strategy of strengthening the country by sports. Moreover, in the past 30 years, the physical health standards for Chinese university students have shown a downward trend in meeting the 1000 meter and 800 meter standards for males and females, with males slowing down by 36 seconds from 3 minutes 56 seconds in 1985 to 4 minutes 32 seconds in 2014. The female students slowed down by 39 seconds from 3 minutes and 55 seconds in 1985 to 4 minutes and 34 seconds in 2014. The problem of physical fitness among college students has been declined in recent years. According to a random test and review data from the Ministry of Education on the physical health of 1.15 million students in 2020, the national failure rate of physical health among college students was 30%. Moreover, according to literature, college students are showing a declined trend in projects such as measuring their sustained cardiopulmonary function at 800 meters and 1000 meters. In 2019, the Ministry of Education and six other departments jointly conducted the eighth national survey on student physical fitness and health. The results showed that compared with 2014, the results of male students aged 19-22 in the 1000 meter race and female students in the 800 meter race decreased by 12.37 seconds and 9.56 seconds, respectively. How to face the crucial situation and actively explore breakthrough path is very challenging.

According to the 8th National Student Physical Fitness and Health Survey conducted in 1258 schools in 93 cities across 31 provinces (autonomous regions, municipalities directly under the central government) and Xinjiang Production and Construction Corps in 2021, a total of 374257 students were surveyed, covering full-time students in ordinary primary and secondary schools, as well as ordinary higher education institutions. The results showed that the development indicators such as height, weight, and chest circumference of students nationwide continued to improve, and their lung

capacity levels comprehensively increased. In terms of physical flexibility, strength, speed, and endurance, primary and secondary school students have shown improvement, but college students still have not shown much improvement. The problem of declining physical fitness among college students has not been effectively curbed.

At present, the existing means for Chinese universities to improve the physical fitness of college students include physical education classes, extracurricular physical exercise, extracurricular sports competitions, and so on. Physical education class teaching is an effective way and platform for college students to directly obtain physical exercise. However, due to class hour limitations, physical education classes are generally held once a week. In addition, extracurricular physical exercise, extracurricular sports competitions, and other forms of activities are influenced by student enthusiasm, and the number of participants is also limited, which cannot fully cover all students.

Herein, on the basis of the good results achieved by students in the early stage, "Lerun" was implemented comprehensive coverage of students and integrated into university physical education courses. We made Lerun related to the physical education grades of students and built an Integrated Teaching Model for Physical Education in and out of Colleges and Universities. It was shown that this method thereby further mobilizes students' enthusiasm for participating in extracurricular exercise and significantly improves their physical condition.

## 2. Methods

200 students were randomly selected from the optional basketball class of Grade 2021 college physical education (III). Group 1 (n=50) and group 2 (n=50) as the experimental groups. Group 3 (n=50) and group 4 (n=50) are referring groups. Two experiments were conducted, namely, experimental group 1 and referring group 3, experimental group 2 and referring group 4. The experiment was carried out from September 2022 to December 2022. Specific steps and Requirements are as following:

(1) In order to strictly control the experimental conditions, standards and teaching, the diagnostic evaluation compares the physical fitness (pull-ups/sit-ups, standing long jump) and basic skills (one-minute shooting) with the experimental and referring groups respectively. It is sure that there is no significant difference ( $P > 0.05$ ).

(2) Teaching in the referring group: Teaching is conducted according to the syllabus of basketball optional course of college physical education (III).

(3) Teaching in the referring group: In addition to teach according to the syllabus of basketball optional course of college physical education (III), extra-curricular fitness running is added to intervene, i.e. "Lerun" (mobile APP);

(4) Requirements for extracurricular fitness running activities of "Lerun":

① The period of extracurricular fitness running in the experimental group is from September 19th to December 11th;

② The daily running time is 6: 00-22: 00;

③ The safe running area: Arts and Sciences Campus;

④ Completing 55 times of extracurricular fitness exercises, this is qualified to participate in the course performance evaluation of College Physical Education (III) in this semester. If the number of times is less than 55, the course score of College Physical Education (III) will be assessed as failing.

⑤ The effective criteria for a single movement :

Boys: The mileage is 2km, and the running pace is within the range of 3-10min/km.

Girls: The mileage is 1.5km, and the running pace is within the range of 3-10min/km.

Note: The school is located on the hills, and the paths in the school are mostly sloping fields.

⑥ Sports records are associated with sports achievements at most once a day, and the excess is only recorded but not associated with achievements. The maximum mileage limit for a single exercise is 10 km.

3. Results and Discussions

3.1. The results of "Lerun" into College Sports

3.1.1. Pre-assessment Students' Basic Physical Quality and Skills Evaluation

Through two rounds of Pre-assessments on the students of College Physical Education in the experimental and the referring groups, the results are shown in Figure 1 and Figure 2. The comparison of the results between the experimental group and the referring group in the three basic qualities of pull-up/sit ups, standing long jump, and one minute shot in the first pre-test showed 66.09, 66.44, 65.56, and 66.39, 66.91, and 64.87, respectively. The comparison between the experimental group and the referring group in the second pre-test showed that their scores in the three basic qualities of pull-up/sit ups, standing long jump, and one minute shot were 65.94, 67.20, 66.60, and 66.35, 67.62, and 66.43, respectively.

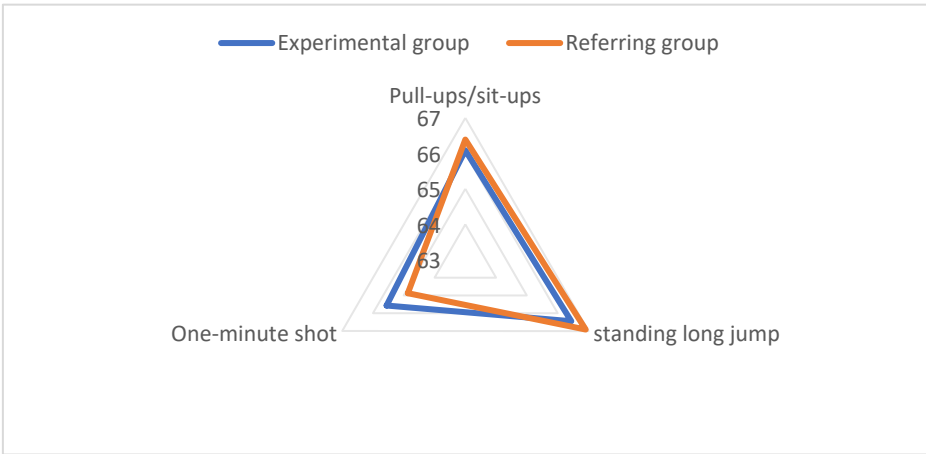


Figure 1. Evaluation of Basic Physical Fitness and Skills of the First Pre-assessment.

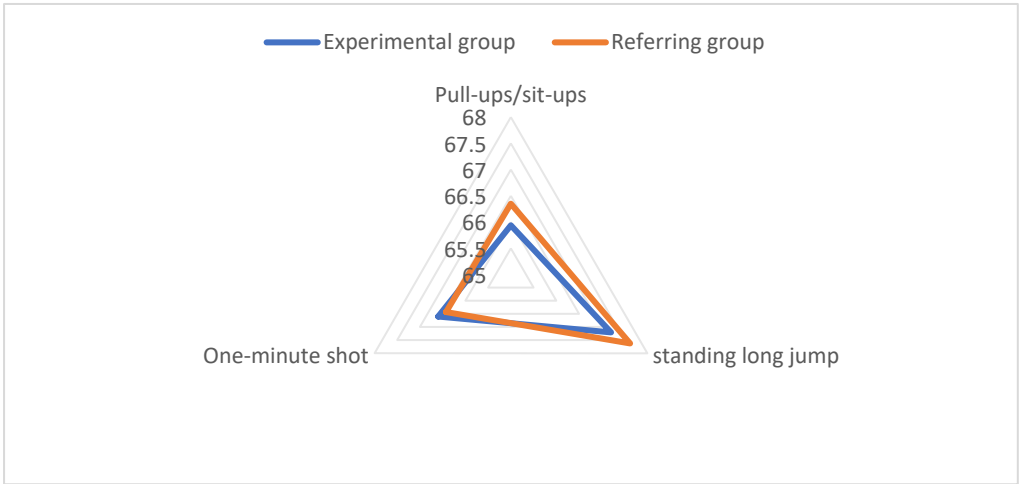
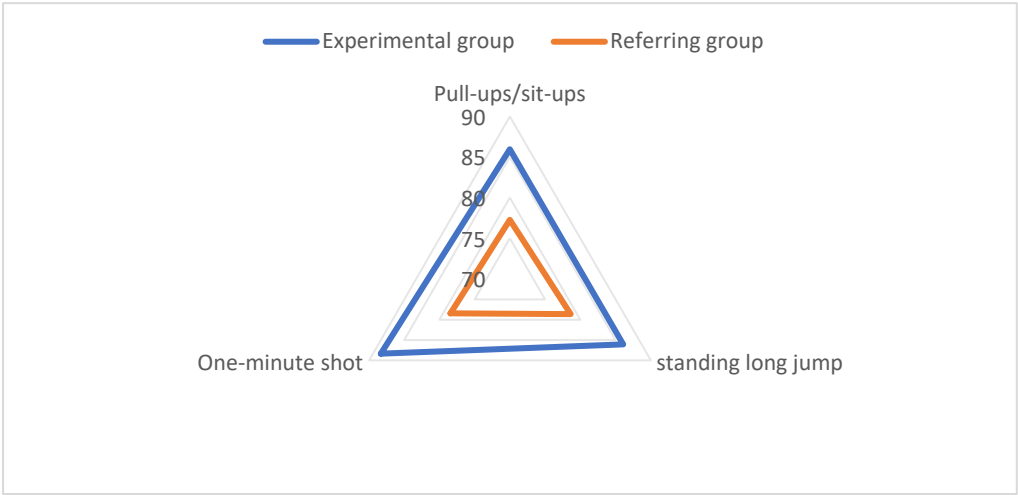


Figure 2. Evaluation of Basic Physical Fitness and Skills in the Second Pre-assessment.

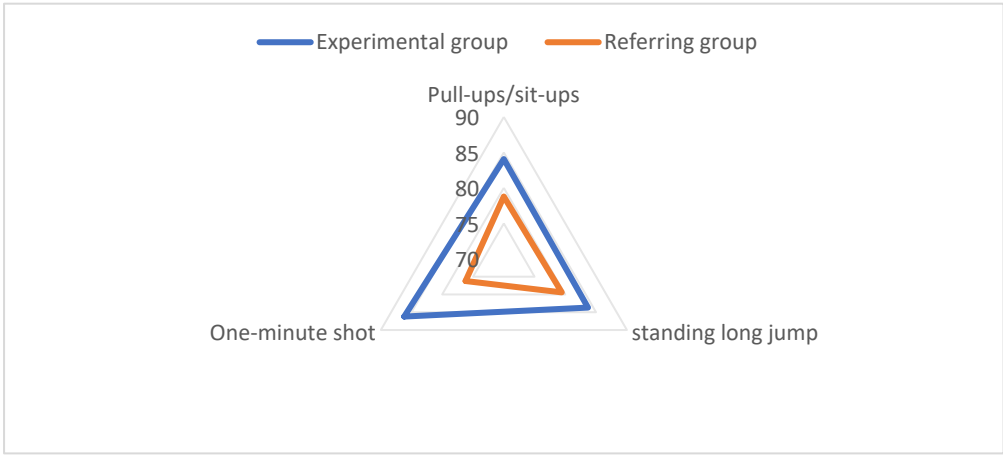
3.1.2. Post-test Students' Physical Fitness and Technical Achievements.

During the epidemic prevention and control period, the combination of online and offline teaching after students returned to school according to the prevention and control measures, has lasted for more than three months. According to the data in Figure 3 and Figure 4, the results of the experimental group and the referring groups were both improved. And for the first post test of the three basic qualities, the experimental group increased by 30.08%, 29.56%, and 34.75% respectively,

while the referring group increased by 16.42%, 17.5%, and 20.93% respectively. The second post test showed that the experimental group increased by 27.49%, 24.54%, and 29.4% respectively, while the referring group increased by 18.76%, 17.44%, and 14.75%, respectively. However, the experimental composition is better than that of the referring group. Specifically, in the first post test, the experimental group showed a 13.66%, 12.06%, and 13.82% improvement in basic qualities and skills compared to the referring group. The second post test showed an increase of 8.73%, 7.1%, and 14.65% in the experimental group compared to the referring group , and the results show significant differences.



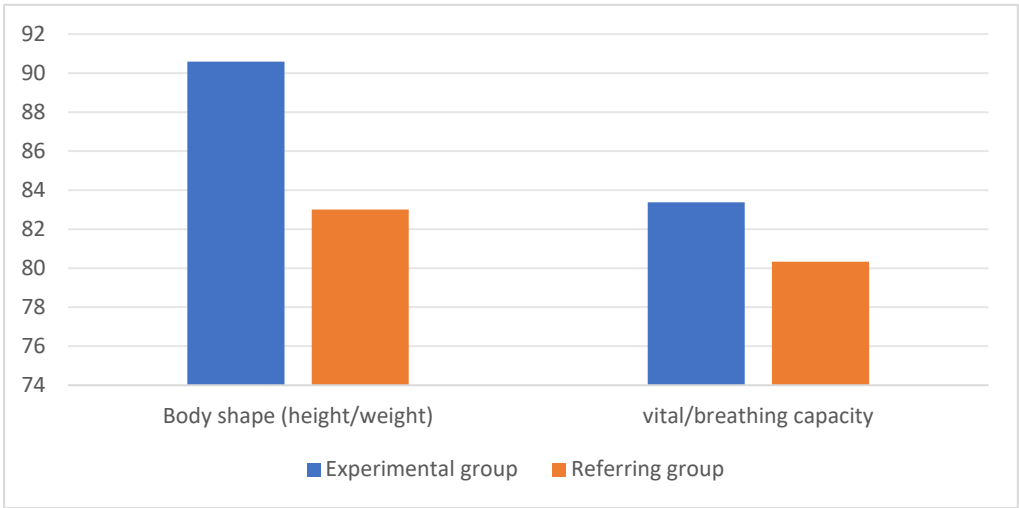
**Figure 3.** Comparison of Students' Physical Fitness and Technical Achievements in the First Post-test.



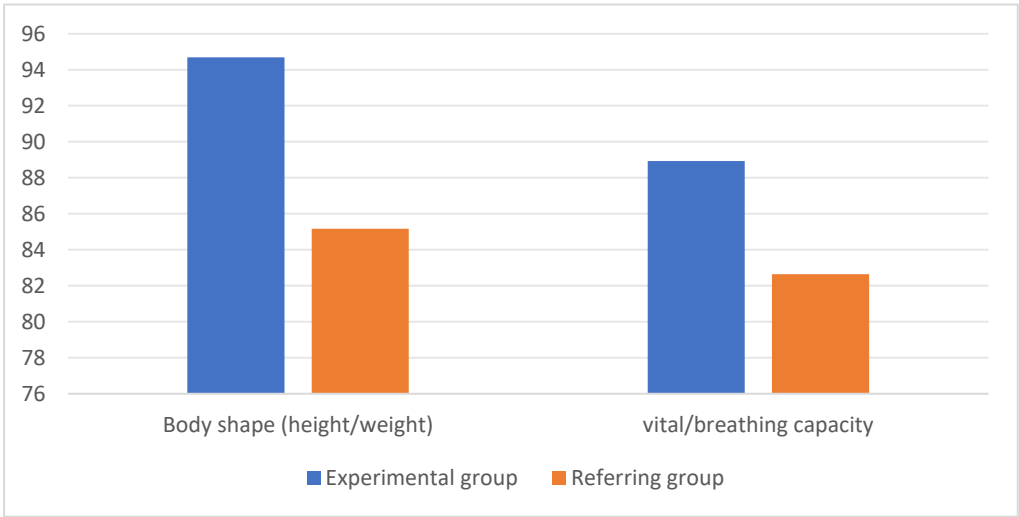
**Figure 4.** Comparison of Students' Physical Fitness and Technical Achievements in the Second Post-test.

3.1.3. Post-test Students' Body Shape (Height and Weight) and Vital capacity Scores.

The students' body shape and vital capacity are tested twice. According to Figure 5 and Figure 6, the experimental composition is superior to the referring group. Specifically, the experimental group showed a 9.13% and 3.8% increase in body shape and vital capacity compared to the referring group in the first post test score; The second post test scores of the experimental group were 11.19% and 7.61% higher than those of the referring group. And the results show significant difference ( $P < 0.05$ ).



**Figure 5.** comparison of students' body shape and vital capacity after the first post-test.



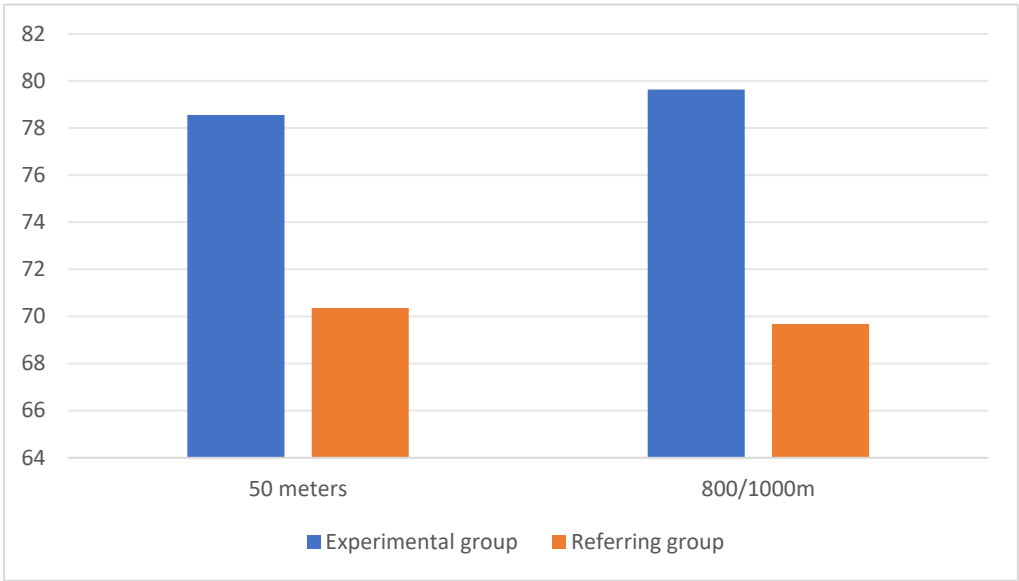
**Figure 6.** Comparison of students' body shape and vital capacity after the second post-test.

3.1.4. Post-test Students' Performance in 50m and Endurance Running (1000/800m).

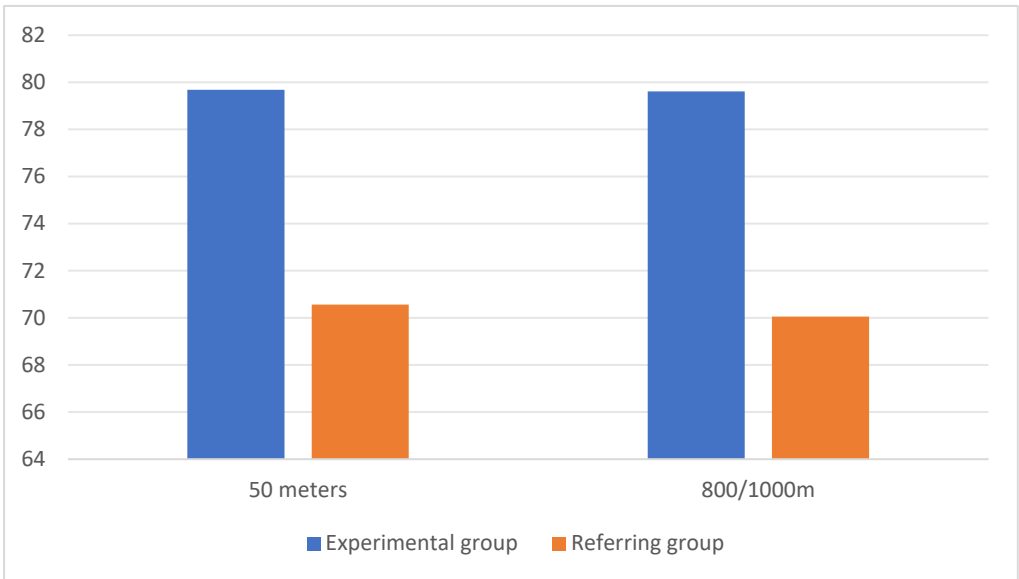
Through two sprints and middle-long runs for students (boys: 1000 meters; Girls: 800 meters) and according to the data in Figure 7 and Figure 8, the experimental composition is superior to the referring group, and the results show significant differences .Specifically, after the first experiment, the experimental group achieved 11.64% and 14.28% higher scores in 50 meters and 800/1000 meters compared to the referring group. After the second experiment, the results of the experimental group were 12.93% and 13.65% higher than those of the referring group.

3.1.5. Investigation on the Effect of Extracurricular Fitness Run "Lerun" Integrating into University Physical Education Class Course.

In order to fully understand the application effect of college physical education in extracurricular fitness running, students (n=100) in two experimental groups were investigated by distributing questionnaires. After collecting the questionnaires (100 questionnaires are distributed, 100 are recovered, and 100% of the valid questionnaires are collected), the data are counted, sorted and analyzed, which have involved students' evaluation of college physical education, students' physical health evaluation, students' evaluation of teaching and so on.



**Figure 7.** Comparison of students' sprint and endurance running results in the first post-test.



**Figure 8.** Comparison of students' sprint and endurance running results in the second post-test.

3.2". *Lerun"* on The Effect of Students.

3.2.1". *Lerun"* on the students' body shape and physical function.

At present, body and weight are the visual factors for evaluating body shape. In the analysis of health evaluation indexes of allergic constitution in different periods, body weight is mainly used as a standard for evaluating body symmetry. Low weight, normal, overweight and obesity will all affect physical function. According to aforementioned investigation and study, "Lerun" can greatly improve the physical quality. The usage of Lerun can improve the weight of patients, and the weight grade can gradually change from obesity to normal.

Respiratory system is a key factor affecting the development of human body function and potential respiratory function of human body can be indicated from vital capacity. At present, vital capacity, which is an important index representing human body function, is an important index in students' physical fitness test and its score accounts for 15 points (15%) in students' physical health standard test. Previous reports had shown that after one semester's intervention, students' lung



capacity is higher than those without exercise. Jogging on the trail can improve students' lung capacity and effectively restrain the decline of female lung capacity. Compared with the traditional physical education teaching, after a semester's intervention, "Lerun" can effectively increase the intensity of students' ventilator activities, which could be induced by enhanced elasticity of lung tissue by improving the quality of gas exchange in the lungs and promoting the improvement of cardiopulmonary function.

### 3.2.2". Lerun" on The Physical Fitness of Students.

Physical fitness is a manifestation of a person's physical strength. In sports activities, physical endurance, agility, strength and speed are major indicators to evaluate physical fitness which is closely related to nutritional exercise and can be improved by adopting proper exercise. According to the standards of students' physical health in China, the current indexes for evaluating physical fitness mainly include standing long jump, pull-ups/sit-ups, 50m, 800m/1000m, which are slightly different from male and females.

Firstly, female's 800 meters and male's 1000 meters, as indicators of human endurance quality, account for 20% in the standard test of students' physical health. Middle and long-distance running events are also important indices to test students' respiratory function and endurance. Students with poor self-control and weak sense of independent exercise have little influence on the improvement of their endurance running performance. After the application of the "Lerun" APP, the aerobic endurance for these students had not improved, mainly because of the short period. In order to improve the endurance of students, we need to integrate physical education teaching on the existing basis and guide students to use fragment time to strengthen exercise and improve their endurance level.

Second, for the strength and coordination of lower limbs, standing long jump which is a key event reflecting the explosive power level of human body and certain flexibility, also accounts for 10% in the physical health standard test. It mainly requires the coordination of upper limbs, lower limbs and hip muscles. The coordination ability of hips, knees and ankles can be effectively improved after the "Lerun" intervention.

Effect on speed and endurance is the third factor. 50 meters and 800/1000 meters are the embodiment of speed and endurance, especially 50 meters, which reflect the speed of students, accounting for 20% in the physical health standard test. Both can reflect joint flexibility, physical coordination and endurance. After the intervention of "Lerun", the overall best and better rate is significantly improved. In addition, the overall awareness of independent exercise is enhanced.

The effect on sports skills is the fourth factor. After the intervention of "Lerun", the students in the basketball option course have better learning skills than those without intervention. It can be seen that the improvement of physical fitness and physical health is conducive to the learning and improvement of sports skills.

## 4. Conclusion

College physical education serves as an important part of school education. After-class fitness running "Lerun" is integrated into college physical education curriculum, students' physical health had been effectively promoted from the aspects of physical shape, physical function and physical quality. It is effective to establish the concept of physical education under the background of Chinese modernization, formulate courses according to students' physical fitness and carry out diversified health activities. It is active to make full use of information digital teaching method, and give play to the value of college physical education.



**Table 1.** Investigation on the Effect of the Experimental Group's Integration of Extracurricular Fitness Running "Lerun" into the University Physical Education Class Course (n=100 people).

Serial number main investigation questions	Yes Number percent		Average Number percent		No Number percent	
1. Is it useful for you to integrate the extracurricular fitness running "Lerun" into the college physical education curriculum?	92	92	4	4	4	4
2. Is it beneficial to enrich your college life if the extracurricular fitness run "Lerun" is integrated into the college physical education curriculum?	91	91	7	7	2	2
3. Do you feel that your physical health has improved when the extracurricular fitness run "Lerun" is integrated into the college physical education curriculum?	91	91	6	6	3	3
4. Do you feel that your interest in learning basketball has improved?	94	94	4	4	2	2
5. Are you satisfied with the course assessment when the extracurricular fitness run "Lerun" is integrated into the college physical education course?	92	92	6	6	2	2
6. Do you feel that your basketball skills have improved?	90	90	8	8	2	2
7. Do you think this will improve your self-awareness and enthusiasm for participating in activities?	96	96	3	3	1	1
8. Do you think this means will help to increase your interest and self-confidence?	98	98	1	1	1	1
9. Do you think this method should be popularized?	97	97	2	2	1	1

References

1. B.Liu, L. Huang. "Leading a new journey of all-round development of competitive sports in China with the spirit of the 20th Party Congress," *Journal of Tianjin Institute of Physical Education*, vol. 37, no.06, 2022.

2. Department of Physical Health and Arts Education, Ministry of Education. Results of the Eighth National Survey on Student Physical Fitness and Health . *Chinese School Health*, no.09,2021.

3. F.He. "Research on the influence of sports APP on college students' physical exercise behavior and effect , " *Journal of Pu 'er University*, no.03, 2020.

4. G.Z.Liu,C.S.Cui. " Discussion on improving college students' cardiopulmonary function under the situation of Physical Test , " *Sports World (Academic Edition)*, no.09, 2013.

5. H.Chen,H.Xu. "Reflections on the implementation and testing of students' physical health standards in China , " *Physical Education*, no.04, 2023.

6. H.F.Jia. "Research on the promotion of college students' physical fitness by the combination of trail running APP and classroom physical education-taking Xi 'an Industrial and Commercial College as an example , " *Sports Fashion*,no.06, 2023.

7. H.Wang. "College Students Experiencing the Crispy Label and Cultivating a Hard Core Mentality , " *China Youth Daily*, no.003, 2023 .

8. [Http://www.moe.gov.cn/s78/A17/twys\\_left/moe\\_938/moe\\_792/s3273/201407/t20140708\\_171692.html](http://www.moe.gov.cn/s78/A17/twys_left/moe_938/moe_792/s3273/201407/t20140708_171692.html).

9. [Http://www.hn.chinanews.com.cn/news/shsh/2023/1207/484290.html](http://www.hn.chinanews.com.cn/news/shsh/2023/1207/484290.html)

10. [Https://mp.weixin.qq.com/s/oDeGvbWyFDa0hAqoy68g8w](https://mp.weixin.qq.com/s/oDeGvbWyFDa0hAqoy68g8w).

11. [Https://www.thepaper.cn/newsDetail\\_forward\\_18033813](https://www.thepaper.cn/newsDetail_forward_18033813)

12. J.Li, S.L.Liu. "The Background, Basic Connotation, and Practical Reflection of Church, Diligence, and Regular Competition," *Journal of Sports*, no.06,2022.

13. J.P.Xi. "Hold High the Great Banner of Socialism with Chinese Characteristics and Strive in Unity to Build a Modern Socialist Country in All Respects: Report in The 20th National Congress of the Communist Party of China (CPC)," *People's Daily*, vol. 01, 2022.

14. J.X.Zhai. "There are skills in systematic training of physical test items in senior high school entrance examination, " *China School Physical Education*, no.11, 2013.

15. M.Y.Guan. "Exploration on the construction of integrated teaching mode in and out of class in college physical education teaching , " *Contemporary educational practice and teaching research*, no.09, 2023.

16. Ministry of Education. "National Guidelines for Physical Education Curriculum Teaching in Higher Education Institutions," 2002.
17. R.R.Zhang,H.P.Tong."An empirical study on the intervention effect of Trail Run APP on the physical health of obese female college students-taking Sanquan College of Xinxiang Medical College as an example," *Sports-Leisure (Mass Sports)*, no.07, 2022.
18. S.H.Jiang,W.K.Zhao,C.L.Zhu,et al. "Research on the Current Situation and Countermeasures of the Eighth National Survey on Student Physical Fitness and Health," *Sports Products and Technology*, no.16,2022 .
19. S.P. Fang, Y. W. Xue, Z. F. Guo, et al. "An empirical study on the impact of sunshine long-distance running on college students' physical health-taking Kunming University of Science and Technology as an example," *Youth Sports*, vol. 01, pp. 36-39, 2022.
20. Stamen. "Research on the application of sports APP in online sports teaching in colleges and universities," *Contemporary Sports Science and Technology*, no.26,2021.
21. W.X.Xing, W.C.Zhang. "The current situation, problems and solutions of college students' physique research in China," *Journal of Mianyang Normal University*, no.05,2022.
22. Wuhan University Push Running APP: "Students' running mileage will be related to sports performance," *China Education Network*, no.11,2017.
23. X.N.Liu."Analysis of Strategies for Improving Physical Fitness of Students in College Physical Education Teaching," *Innovation Research on Ice and Snow Sports*, no.08,2023.
24. Y.liu,Y.H.Liu , X.Jun et al. "Research on the Application of Campus Happy Run APP in the Integration of University physical education class," *Educational Modernization*, no.4,2020.
25. Y.P.Luo. "Analysis of college students' physical health status and coping strategies of teaching reform," *Contemporary Sports Science and Technology*, no.32, 2014.
26. Y.S.Guo, S.L.Deng. "The promotion effect of trail running APP combined with physical education classroom teaching on the physical health of female college students," *Sports Boutique (Academic Edition)*,no.07, 2018.
27. Y.Z.Wang. "Construction of integrated teaching mode in and out of physical education classes in colleges and universities," *Journal of Jilin Agricultural Science and Technology College*,no.06, 2020.

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